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April 24th, 1849.

Mr. Phillips in the Chair.

The Committee to whom was referred the following communication from Dr. Keller, reported in favour of publication in the Proceedings.

On Ciliary cells in some marine naked Mollusca, in embryo.

By Wilhelm Keller, M. D.

In following the development of the ova of different species of Eolis, of the Acteon viridis, and of a little mollusk lately found and described by Mr. Agassiz under the name of Cantops Harvardianus, I often noticed in the surrounding transparent zona, which is falsely considered by authors generally as the white of the egg, one or two, seldom more, small moving bodies, which were first observed by Professor Volkmann,* who considered and described them as animals.

The circumstance that the motion is more a rythmic jumping, not very unlike to that of the moving corpuscles of the sperm, and the observation that it always occurs in the same degree of perfection, and only in those eggs in which the cilia at the cephalic end of the embryo have attained their highest development, caused me to think that those moving bodies might be nothing more than detached ciliary cells of the embryo itself, an opinion which I afterwards found advanced in a note by Professor Charles Vogt,† in his treatise on the development of the Acteon viridis. To solve this question seemed to me important enough to try the experiment of isolating some of the cells from the animal.

Before I describe the cell itself I will mention its development, and connection with the animal. So soon as the eggs of the above named animals are laid, they begin immediately the process of division, and when this process has so far advanced that the yolk globules are so small that they seem to have disappeared, ciliary motion appears at the edges of the yolk. The embryo, so soon as the cilia are formed, rotates sometimes to the right side, sometimes to the left, and changes the direction so soon as there is the least impediment opposed to it. The rapidity of the motion varies; I counted seventy rotations in a minute. The next change in the embryo is real cell formation. There appear cells towards the inferior end, which I consider as liver cells; and which are mother cells, contrary to Professor Vogt's opinion; two cells in the head, the ear cells containing three cells, and a ring of cells provided with long cilia around the head. In the mean time the other cilia are disappearing. The embryo is now no more unconsciously rotating, but the whole body is stretched out, and the only motion observed in it is performed by the long cilia, which are seen folded together like a fan, or playing like the wheel of rotiferous animals. This motion changes very often and seems to be entirely under the control of the animal itself, notwithstanding the animal does not show any formation of nerves, as it only consists of cells at this period, and there is no fibrous structure to be perceived, so that the embryo of these higher animals shows, at least apparently, voluntary motion without a nervous system like the lowest orders of the animal kingdom. By some pressure the ring formed of the mentioned cells appears more distinctly, and by crushing the animal with some care the cells may be isolated, and they will be seen to be entirely identical with the animals described by Volkmann under the name of Cosmella hydrachnoides. They are round cells with one or two nuclei, having always four very long cilia, which are united in pairs and then fuse together in the cell wall. The motion is a slow rythmical jumping, produced by alternating contraction and expansion of the cell by which the cilia, if not called otherwise for distinction, are made to act like the motion of a whip. But this power of the cells producing the movement, must cause the latter to be considered as something entirely different from ciliary motion, and, in fact, it appears as if a great many different motions were understood under this term, the real nature of which have not yet been studied.

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* Versuch einer Monographie des Tergipes Edwardsii," read before the Academy of St. Petersburg, Feb. 9th, 1844. The author calls these cells Cosmella hydrachnoides, and considers them as an instance of spontaneous generation.

† Recherches sur l'Embryogenie des Mollusques Gasteropodes par M. C. Vogt, presentees a l'Academie des Sciences le 2 Mar. 1846.

If we are led sometimes by first observations to the theory of generatio æquivoca, as the facts here presented have done, repeated and more close observation brings us from this extraordinary theory always back to the old law, Omne vivum ex ovo. The supporters of the generatio æquivoca have certainly lost in the separation of these cells from the number of animals, as much as by the discovery that the so-called spermatozoa are but the changed nuclei of cells, formed in the male genital organs of animals.

As regards the particular movements in organic formations independent of the nervous system, and even for a certain time independent of the mother animal to which they belong originally, we have, at the present time, not less than four.

1. The motion of corpuscles of sperm. Transformed nuclei of cells.

2. Ciliary motion, roundish or cylindrical, perfect cells of epithelium on free surfaces, with a number of cilia, which are in constant motion independent of the cell.

3. The Chromatophores of the Sepia. They cover the animal and produce by their constant contraction and expansion, the beautiful colours which it presents. For which reason, Rudolph Wagner, who first observed this interesting phenomenon, called them Chromatophores?

4. The fourth is a simple cell with four long hair-like appendages, as I have described them. Here the cells contract and the appendages are by this property set in motion. This form has only been observed till now in embryos, whilst the first one belongs only to full grown animals, the ciliary motion is to be found at any age, and the chromatophores only after the animal, which is provided with them, has come to its last type.

The Committee on Prof. Meigs' Memoir, entitled "Observations on the reproductive organs, and on the fœtus of the Delphinus Nesarnak," reported in favour of publication in the Journal of the Academy.

The Monthly Report of the Corresponding Secretary was read and adopted.

Dr. Leidy having stated that Prof. Agassiz was very desirous of having a drawing and engraving made in Boston of the skull of a Manatus, in the cabinet of the Academy, on motion of Dr. Elwyn, Art. 1, Chap. viii. of the By-Laws was suspended for one month, in order to comply with the request of Professor Agassiz.

ELECTION.

Thomas Pennant Barton, Esq., of Philadelphia, was elected a *Member* of the Academy.